

# Agriculture's Impact on Us and the Environment

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### Introduction:

What are the effects of conventional agriculture on the surrounding environment and our local community? Our project focuses on answering this question in order to educate our fellow schoolmates from Pajaro Valley High School about the detrimental effects conventional agriculture can have on our local environment and community as opposed to more sustainable organic methods. We did this through the completion of various sub-projects in order to expand our knowledge about those effects. As a means to cover all the aspects of our question, we:

- Researched contextual information relating to agriculture and our local environment.
- Researched chemical components of pesticides and the amounts and methods of use of such pesticides.
- Conducted water quality tests to analyze the chemical levels of nutrients and possibly pesticides in three of our community's sloughs.
- Interviewed members of farm-related organizations in and around our community, such as J&P Organics and California Alliance Family Farmers (CAFF).

During the time that we conducted all of our investigations, we also established a small community garden in our high school as a way to imitate sustainable organic agriculture.

We developed a passion for this topic based on our personal interests in the natural environment and the sloughs of Watsonville, which we are lucky to live in. Personal connections with farm workers have also been a driving force behind our efforts to educate our peers in order to diminish the negative effects of conventional agriculture on the farmer's health.

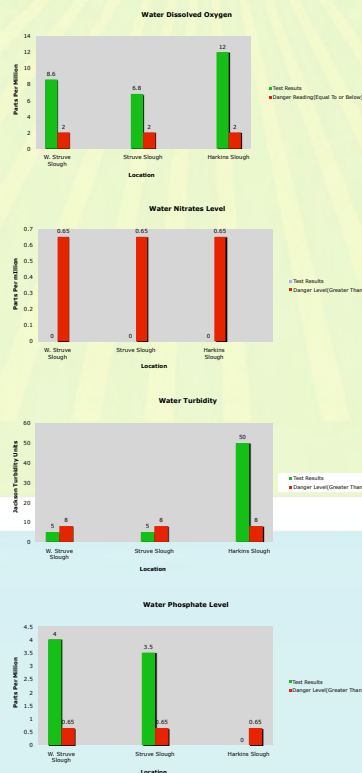
### Materials and Methods:

In order to gain chemical results which could potentially show the presence of pesticides and fertilizers in the wetlands, we conducted six different chemical tests on each of three sites that we visited. The water we tested was from West Struve, Struve and Harkins Slough, all of which are in close proximity to conventional farms and thus prone to the effects of fertilizer and pesticide runoff. We tested for nitrate and phosphate levels, amounts of dissolved oxygen and turbidity, PH, and temperature. To test for nitrates we used the CHEMetrics VACUettes kit model K-6904D. For phosphates, the CHEMetrics Phosphate K-8510 CHEMetrics kit. For turbidity, the LaMotte turbidity test kit model TTM. For Dissolved Oxygen, the LaMotte Dissolved Oxygen kit model EDO. For pH, the Macherey-Nagel pH-Fix 4.5-10.0 test kit.

### Results:

After analyzing and revising all data acquired through water testing the 3 sites (West Struve, Struve, and Harkins Slough) we reached the conclusion that our local watershed was in an environmentally acceptable condition. Dissolved Oxygen (DO) is essential for all aquatic life in any body of water be it a pond, lake, ocean or wetland. In all 3 sites the levels of DO were approximately 2 to 3 times higher than the Danger Level (DL) of 2 Parts Per Million (ppm) therefore there is no threat to biodiversity. Turbidity is a measure of how much sunlight can penetrate a body of water and is measured in Jackson Turbidity Units (JTU). In West Struve and Struve Slough the levels were healthy but climbed to an astonishing 50 JTU in Harkins Slough! This may be a result of the large amount of rain just a few hours prior to sample collection leading to sedimentation. In extreme cases high turbidity levels block so much light that the rate of cellular respiration (photosynthesis) slows down enough that the amount of DO drops down below 2 ppm and becomes anoxic. Nitrate is a polyatomic form of nitrogen that is an essential nutrient for both animal and plant life; it is often added in to crops as a fertilizer along with phosphate, the polyatomic form of phosphorus (also essential to life). The nitrate levels were so low in all 3 sites that our test equipment could only read them as < 7.5 ppm. Phosphates were below 7.5 ppm in Harkins slough but higher than the DL in West Struve and Struve Slough. This appeared to pose no immediate threat however.

In cases where there is an excess amount of nitrates and phosphates in the water, over stimulation of algal growth occurs. The increase in algae blocks sunlight and raises the turbidity level, to the point in which photosynthesis rate drops and forces DO levels down to anoxic (2 ppm) and eventually eutrofication. Eutrofication is the state a body of water reaches when an algal bloom depletes enough oxygen that it becomes impossible for anything to survive and is utterly irreversible.



### Conclusion:

One of the major leading conflicts of conventional farming is the use of pesticides. Approximately 650,000 pounds of methyl bromide were used in the strawberry industry alone in the year 2000. In the years prior to that, the amounts of pesticides had been gradually increasing. However, following the year 2000, many Americans were struck with a new idealism of purchasing organic produce, which began the "Organic Revolution" one would say. For unknown reasons, we could not find recent studies regarding the amounts of methyl bromide use in Santa Cruz County. Consequently, the amount of methyl bromide used in agriculture still remains unknown.

For instance, methyl bromide is a pesticide that is frequently used around Watsonville in the strawberry industry. Methyl bromide is a declared toxin by the Environmental Protection Agency (EPA). There are many environmental health issues involving pesticide use, whether it is from agricultural runoff or from over spraying chemicals which then can become airborne. Runoff from agricultural fields can potentially contaminate surrounding environments and bodies of water, with pesticides and manure runoff alternating the levels of: dissolved oxygen, turbidity, phosphates, and nitrates. In all three sites the levels of Dissolved Oxygen, Turbidity, Nitrates, and Phosphates were all at an overall healthy level that will not hinder the survival of the various species of plants and animals living there as well as the condition of the water for future generations.

Airborne particles of pesticides expose humans and animals to come into contact with pesticides both directly and indirectly. Pesticides that do not break down into simpler substances pose a greater long term exposure risk for farm workers and, residents living near farms. Some of these health risks include; neurological damage, lung damage, and possibly lead to various types of cancer. In addition, the nearby residents can experience various types of symptoms such as nausea, headaches, blurred vision, and dizziness. For those who do not live in the area or work in the agricultural industry, people still eat the food grown, produce carries pesticides even if they are thoroughly washed. That is where one should question whether or not they are really affected by pesticides.

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